MATHEMATICS
Standard: The adult learner develops and applies math strategies to a variety of situations

ASE I PERFORMANCE STANDARDS

BEGINNING	APPROACHING	MET	EXCEEDS
At this level, the student exhibits some evidence of conceptual and procedural understanding when solving problems and performing the tasks below. The student is able to determine which of the available data are necessary and sufficient for correct solutions and use them in problem solving; however, the student's skill in communicating mathematically about these concepts is limited. Sometimes in familiar, routine situations, the student:	The student is able to apply reasoning and generalize from some patterns and examples in the areas of algebra, geometry, and statistics. The student is able to use correct mathematical language and symbols to communicate many mathematical relationships and reasoning processes. Written solutions are organized and presented with some supporting information. Often in familiar, routine situations and sometimes in unfamiliar, non-routine situations, the student:	At this level, the student has a thorough understanding of the concepts listed below – an understanding sufficient for problem solving in practical situations. The student is able to apply reasoning and generalize from some patterns and examples as well as integrate mathematical concepts and procedures in the areas of algebra, geometry, and statistics. The student is able to judge and defend the reasonableness of answers, make conjectures, defend ideas, and give supporting examples. The student is able to compare and contrast mathematical ideas and generate examples; distinguish between relevant and irrelevant information; sequence, prioritize, and observe patterns; and recognize the degree of precision needed in the answer. Written solutions are organized and presented both with supporting information and explanations of how they were achieved. Most of the time in both familiar, routine and unfamiliar, non-routine situations, the student:	At this level, the student: • applies mathematical concepts and procedures consistently to solve complex problems in the various strands • applies strategies and results from simpler problems to more complex situations and integrates concepts and techniques from different areas of mathematics to solve problems • express the solution clearly and logically using appropriate mathematical notation and terms and clear language, and supports solutions with evidence, in both oral and written work • formulate generalizations of the results obtained and extends them to other areas of mathematics and other circumstances, including expressing the solution as a general rule • creates models through probing examples and counterexamples • communicate mathematical reasoning through the clear, concise, and correct use of mathematical symbolism and logical thinking • explain the logic inherent in a solution process, by making generalizations and showing that they are valid, and by revealing mathematical patterns inherent in a situation

MATHEMATICS

Standard: The adult learner develops and applies math strategies to a variety of situations

Indicator A: Develops and applies number sense to solve a variety of real-life problems and to determine if the results are reasonable

ASE I Performance Standards/ Number Sense

BEGINNING	APPROACHING	MET	EXCEEDS
• explains the concept of positive and negative numbers • sets up a ratio/proportion problem	• uses computation and estimation to solve word problems involving integers, exponents, square roots, and scientific notation • places positive and negative numbers on a number line • adds, subtracts, multiplies, and divides positive and negative numbers • estimates the square root of any whole number to the nearest whole number	• uses computation, estimation, and/or proportions to solve word problems involving integers, rational numbers, exponents, square roots, and scientific notation • estimates the square root of any whole number to the nearest whole number • places integers in correct sequence • adds, subtracts, multiplies, and divides positive and negative numbers and explains the effect • represents and uses numbers with exponents	SAME

ASE I Performance Standards/ Data Analysis:

Indicator B: Applies data collection, data analysis, and probability to interpret, predict and/or solve real-life problems.

BEGINNING	APPROACHING	MET	EXCEEDS
• organizes and represents data • formulates predictions based on a data set • expresses probability as a simple fraction or percent	• organizes and represents a given data set graphically • formulates predictions based on a given data set • finds the mean, median, and mode of a data set • expresses probability as a fraction or percent	• expresses probability as a fraction or percent • finds the mean, median, mode, quartile, and range of a data set • chooses an appropriate graphic format to organize and represent data • makes valid inferences and evaluates the reasonableness of conclusions drawn from data • formulates and justifies predictions from a given set of data • differentiates between a sampling and a census • uses simulations to determine probabilities of real-world situations	SAME

MATHEMATICS

Standard: The adult learner develops and applies math strategies to a variety of situations

INDICATOR C: Applies algebraic concepts and methods to explore, analyze or solve real-life problems

ASE I Performance Standards/ Algebra

BEGINNING	APPROACHING	MET	EXCEEDS
• recognizes whether positive or negative numbers are to be used in creating algebraic expressions • solves word problems involving computation of cost, distance, and simple interest	• solves computations of cost, distance, and simple interest word problems • determines slope of a line • when given word problems, solves algebraic equations • solves multi-operational equations	• when given word problems, solves multi-operation equations • solves algebraic equations using substitutions • sets up and solves ratio and proportion problems • solves computations of cost, distance, and simple interest word problems • determines slope of a line	SAME

Indicator D: uses geometric properties, relationships, and methods to identify, analyze and solve real-life problems.

ASE I Performance Standards/ Geometry

Beginning	Approaching	Met	Exceeds
• applies the appropriate geometric formula from the GED Math test • uses similarity and proportionality for problem solving • locates an ordered pair of positive numbers on a rectangular coordinate plane	• applies the appropriate geometric formula (i.e., area, perimeter, volume, Pythagorean relationship, distance between two points in a plane) from the GED Math test • uses similarity and proportionality for problem solving • defines and graphs ordered pairs of positive numbers on a rectangular coordinate plane	• recognizes, defines, applies the appropriate geometric formula (i.e., area, perimeter, volume, Pythagorean relationship, distance between two points in a plane) from the GED Math test • uses similarity, proportionality, and alternate interior angles for problem solving • defines and graphs any ordered pair on a rectangular coordinate plane	**SAME**

MATHEMATICS

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Indicator E: Applies knowledge of standard measurements to real-life situations

ASE I Performance Standards/Measurement

Beginning	Approaching	Met	Exceeds
• converts units of measurement into equivalent units of measurement using proportion • converts units of measurement into equivalent units in the metric system by the movement of the decimal point one place value in either direction (e.g., 45 mm = 4.5 cm, or 4.5 m = 450 cm)	• converts units of measurement into equivalent units of measurement using proportion • converts units of measurement into equivalent units in the metric system by the movement of the decimal point in either direction any number of place values • uses scientific notation to express whole numbers and fractions	• using proportion method, converts units of measurement into equivalent units of measurement • converts units of measurement to equivalent units of measurement in the metric system • uses scientific notation to express whole numbers, fractions, and units of measurement	**SAME**

MATHEMATICS

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ASE II

Beginning	Approaching	Met	Exceeds
At this level, the student exhibits some evidence of conceptual and procedural understanding when solving problems and performing the tasks below. The student is able to determine which of the available data are necessary and sufficient for correct solutions and use them in problem solving; however, the student's skill in communicating mathematically about these concepts is limited. Sometimes in familiar, routine situations, the student:	At this level, the student demonstrates some procedural and conceptual knowledge in solving problems in the following areas. The student is able to apply reasoning and generalize from some patterns and examples in the areas of algebra, geometry, and statistics. The student is able to use the correct mathematical language and symbols to communicate many mathematical relationships and reasoning processes. Often in familiar, routine situations and sometimes in unfamiliar, non-routine situations, the student:	At this level, the student has a thorough understanding of the concepts listed below – an understanding sufficient for problem solving in practical situations. The student is able to apply reasoning and generalize from some patterns and examples as well as integrate mathematical concepts and procedures in the areas of algebra, geometry, and statistics. The student is able to judge and defend the reasonableness of answers, make conjectures, defend ideas, and give supporting examples. The student is able to analyze problems by identifying relationships, discriminating relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns. Written solutions are organized and presented both with supporting information and explanations of how they were achieved. Most of the time in both familiar, routine and unfamiliar, non-routine situations, the student:	At this level, the student: • applies mathematical concepts and procedures consistently to solve complex problems in the various strands • applies strategies and results from simpler problems to more complex situations and integrates concepts and techniques from different areas of mathematics to solve problems • expresses the solution clearly and logically using appropriate mathematical notation and terms and clear language, and supports solutions with evidence, in both oral and written work • formulates generalizations of the results obtained and extends them to other areas of mathematics and other circumstances, including expressing the solution as a general rule • creates models through probing examples and counterexamples • communicates mathematical reasoning through the clear, concise, and correct use of mathematical symbolism and logical thinking • explains the logic inherent in a solution process, by making generalizations and showing that they are valid, and by revealing mathematical patterns inherent in a situation • employs forms of mathematical reasoning and proof appropriate to the solution of the problem at hand, including deductive and inductive reasoning, making and testing conjectures and using counterexamples and indirect proof

MATHEMATICS

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Indicator A: Develops and applies number sense to solve a variety of real-life problems and to determine if the results are reasonable.

ASE II Performance Standards/ Number Sense

BEGINNING	APPROACHING	MET	EXCEEDS
• Explains the meaning of absolute value • Uses positive and negative exponents	• Explains the meaning of absolute value • Uses positive and negative exponents • Compares and contrasts the real number system and its various subsystems with regard to their structural characteristics	• Explains the meaning of absolute value • Uses positive and negative exponents • Compares and contrasts the real number system and its various subsystems with regard to their structural characteristics	**SAME**

Indicator B: Applies data collection, data analysis, and probability to interpret, predict and/or solve real-life problems.

ASE II Performance Standards/ Data Analysis:

BEGINNING	APPROACHING	MET	EXCEEDS
• Evaluates the reasonableness of conclusions drawn from interpretation of data in a graphic format • Constructs histograms, line graphs, circle graphs and box-and-whisker plots • Uses mode, quartiles and range as a means for effective decision making in analyzing the data • Explains the effects of sampling on statistical claims and recognizes misuses of statistics • Determines probabilities through experiments and/or simulations and compares the results with predictions	• Evaluates the reasonableness of conclusions drawn from interpretation of data in a graphic format • Constructs histograms, line graphs, circle graphs and box-and-whisker plots • Uses mode, quartiles and range as a means for effective decision making in analyzing the data • Explains the effects of sampling on statistical claims and recognizes misuses of statistics • Determines probabilities through experiments and/or simulations and compares the results with predictions • Determines, from a given plot of data, whether it has strong or weak, positive or negative correlation	• Evaluates the reasonableness of conclusions drawn from interpretation of data in a graphic format • Organizes collections of data into frequency charts, stem-and-leaf plots, scatter plots and matrices and determine outliers • Applies curve fitting to make predictions from data • Explains the effects of sampling on statistical claims and recognizes misuses of statistics • Determines probabilities through experiments and/or simulations and compares the results with predictions • Designs a statistical experiment based on a given hypothesis • Describes, in general terms, the normal curve and uses its properties to answer questions about sets of data that are assumed to be normally distributed • Explains and uses the concept of a random variable • Draws conclusions about the “spread” of data given the variance and standard deviation	SAME

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INDICATOR C: Applies algebraic concepts and methods to explore, analyze or solve real-life problems

ASE II Performance Standards/ Algebra

BEGINNING	APPROACHING	MET	EXCEEDS
• Identifies the independent and dependent variables from a real-life situation • Expresses the relationship between two variables using a table, equation, graph, and matrix and describes the relationship suggested by two or more graphs • Creates a graph from a table of values • Writes an equation of the line that passes through two given points • Evaluates algebraic expressions using substitution • Multiplies and divides monomial expressions with integer exponents • Solves linear equation and inequalities in one variable	• Identifies the independent and dependent variables from a real-life situation • Expresses the relationship between two variables using a table, equation, graph, and matrix and describes the relationship suggested by two or more graphs • Creates a graph from a table of values • Writes an equation of the line that passes through two given points • Determines from two linear equations whether the lines are parallel, are perpendicular or coincide • Uses the definitions of trigonometric functions to find the sine, cosine and tangent of the acute angles of a right triangle • Evaluates algebraic expressions using substitution • Multiplies and divides monomial expressions with integer exponents Solves linear equation and inequalities in one variable, and systems of linear equations in two variables	• Expresses the relationship between two variables using a table, equation, graph, and matrix and describes the relationship suggested by two or more graphs • Creates a linear equation from a table of values and graphs a linear equation and linear inequality in two variables • Determines slope and intercepts of a linear equation • Writes an equation of the line that passes through two given points • Determines from two linear equations whether the lines are parallel, are perpendicular or coincide • Solves simple right-triangle trigonometric equations involving sine, cosine and tangent and uses an appropriate right-triangle trigonometric model to solve a real-life problem • Simplifies numerical expressions using the order of operations including exponents • Simplifies square roots and cube roots with monomial radicands that are perfect squares or perfect cubes • Evaluates numerical and algebraic absolute value expressions and algebraic expressions using substitution	SAME

MATHEMATICS

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Indicator D: uses geometric properties, relationships, and methods to identify, analyze and solve real-life problems.

ASE II Performance Standards/ Geometry

Beginning	Approaching	Met	Exceeds
• Sketches prisms, pyramids, cones, and spheres • Calculates surface areas and volumes of three- dimensional geometric figures given the required formulas • Identifies arcs, chords, tangents and secants of a circle • Classifies transformations based on whether they produce congruent or similar non-congruent figures • Determines whether a given pair of figures on a coordinate plane represents a translation, reflection, rotation and/or dilation	• Sketches prisms, pyramids, cones, and spheres • Calculates surface areas and volumes of three-dimensional geometric figures given the required formulas • Identifies arcs, chords, tangents and secants of a circle • Verifies characteristics of a given geometric figure using coordinate formulas such as distance, mid-point, and slope to confirm parallelism, perpendicularity, and congruency • Classifies transformations based on whether they produce congruent or similar non-congruent figures • Determines whether a given pair of figures on a coordinate plane represents a translation, reflection, rotation and/or dilation	• Sketches prisms, pyramids, cones, cylinders and spheres and classifies them by base shape, lateral surface shape, related surface area and volume formulas • Calculates surface areas and volumes of three-dimensional geometric figures given the required formulas • Deduces properties of, comparisons of, and relationships between geometric figures from given assumptions using informal deductive reasoning • Identifies arcs, chords, tangents and secants of a circle • Translates between synthetic and coordinate representations (e.g., a straight line is represented by the algebraic equation Ax + By = C) • Verifies characteristics of a given geometric figure using coordinate formulas such as distance, mid-point, and slope to confirm parallelism, perpendicularity, and congruency • Applies transformational principles to practical situations (e.g., enlarge a photograph) and gives the new coordinates of a transformed geometric figure • Deduces properties of figures using transformations in coordinate systems, identifying congruency and similarity • Determines the effects of a transformation on linear and area measurements of the original figure and sketches the figure that is the result of a given transformation	**SAME**

MATHEMATICS
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ASE II Performance Standards/Logic and Reasoning

Beginning	Approaching	Met	Exceeds
	• Determines the validity of arguments • Draws a simple valid conclusion from a given if ... then statement and a minor premise and places the statements in logical order • Uses Venn diagrams to determine the validity of an argument • Recognizes the difference between a statement verified by mathematical proof (i.e., a theorem) and one verified by empirical data	• Uses inductive and deductive logic to construct simple valid arguments • Determines the validity of arguments and if the converse of a given statement is true or false • Draws a simple valid conclusion from a given if ... then statement and a minor premise and places the statements in logical order • Analyzes assertions about everyday life by using principles of logic • Uses Venn diagrams to determine the validity of an argument • Recognizes the difference between a statement verified by mathematical proof (i.e., a theorem) and one verified by empirical data • Formulates counterexamples and uses indirect proof to show that a given invalid conjecture is false • Determines the purpose of and writes an algorithm that explains a particular mathematical process	**SAME**